THE REVISED STRESS-RELATED GROWTH SCALE: IMPROVING THE MEASUREMENT OF POSTTRAUMATIC GROWTH

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This study evaluated a revised version of the Stress-Related Growth Scale (SRGS-R). The SRGS-R has two major differences from the Stress-Related Growth Scale (SRGS). It uses neutral wording of items instead of the original positively worded items, and it uses positive and negative scaling choices. This study included participants (N = 764) recruited through Amazon MTurk. There were three versions of the SRGS-R tested - the SRGS with neutral wording of items only (SRGS-R-N), the SRGS with positive and negative scaling only (SRGS-R-S), and the SRGS-R, with both changes. We randomly assigned participants to complete one of four PTG measures - the SRGS-R-N, SRGS-R-S, SRGS-R, or the Posttraumatic Growth Inventory (PTGI). The PTGI elicited the largest levels of reported PTG, while the SRGS-R elicited the smallest levels. The two modified versions displayed scores between the SRGS-R and the PTGI in the small and moderate growth groups. In the current study the SRGS-R was negatively related to PTSD symptoms, depression, anxiety (negative, but not statistically significant), global distress (negative, but not statistically significant), and avoidance-focused coping (negative, but not statistically significant), and positively related to positive well-being, quality of life, problem-focused coping, and emotion-focused coping. In comparison, the PTGI was unrelated to depression, anxiety, and global distress, and positively related to PTSD symptoms, positive well-being, quality of life, and all three coping styles. These findings provide further evidence that the SRGS-R is an improvement over the PTGI in measuring actual growth, while limiting illusory growth. We found the combination of these changes yields the greatest improvements in measurement. By improving the measurement of PTG, we can reduce the variation in reported

PTG following traumatic events found throughout the literature. This will allow researchers and clinicians to better identify which factors contribute to growth following traumatic events, and aid them in designing treatments to encourage actual growth following traumas.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

THE REVISED STRESS-RELATED GROWTH SCALE: IMPROVING THE MEASUREMENT OF POSTTRAUMATIC GROWTH

Introduction

Current psychological research indicates that more than 89% of Americans will experience at least one traumatic event in their lifetime, with most people experiencing multiple traumas (Kilpatrick et al., 2013). Though experiencing a traumatic event is exceedingly common, only 6.8% of trauma victims in the U.S. develop posttraumatic stress disorder (PTSD) symptoms following the event (Kessler, Berglund, Delmer, Jin, Merikangas, & Walters, 2005). The prevalence rate for PTSD may appear small, but when accounting for the entire U.S. population, this amounts to millions of people who will suffer from these symptoms. PTSD symptoms include intrusive thoughts, depression, suicidal thoughts, avoidance, hyperarousal, and numbing (American Psychiatric Association, 2013). Although PTSD symptoms may be debilitating, those with PTSD occasionally report signs that their lives have also improved following the trauma (Tedeschi & Calhoun, 1996).

Posttraumatic Growth

Posttraumatic growth (PTG) is a construct representing real or perceived growth following a traumatic event (Tedeschi & Calhoun, 1996). Tedeschi and Calhoun (1996) describe PTG as a combination of an improved sense of self (i.e. greater self-reliance, improved confidence, and a feeling of being a stronger person), improved relationships with others, and a new philosophy of life (i.e. a stronger belief system and a greater appreciation of one's own existence) following a traumatic experience. These changes are theorized to occur more strongly in individuals after experiencing traumatic events than in those without traumatic experiences

(Tedeschi & Calhoun, 1996). Ideally, we would like to experience positive psychological changes following any traumatic experience. Growth, however, seems to vary greatly following traumatic events (30-70%; Linley & Joseph, 2004). Reported prevalence rates of PTG vary widely between types of traumatic events as well. For example, PTG following a natural disaster was reported at 51.1% (Jin, Xu, Liu, & Liu, 2014), whereas 87% of breast cancer survivors (Lelorain, Bonnaud-Antignac, & Florin, 2010), and 26.9-37.2% of U.S. combat veterans reported growth following their traumatic experiences (Hijazi, Keith, & O'Brien, 2015). Current literature also reports mixed results when comparing PTG prevalence rates between those who have experienced a DSM-defined trauma and those who have not (Eve & Kangas, 2015). A study assessing PTG in accidentally injured patients indicated 80% reported growth one month following their accident (Wang, Wang, Wang, Wu, & Liu, 2013), and a longitudinal study of emergency responders reported 100% experienced at least a small amount of growth after 18 months on the job (Shakespeare-Finch, Smith, Gow, Embelton, & Baird, 2003).

Posttraumatic Growth Inventory

Perhaps one reason for the aforementioned great variance in reported levels of PTG lies in our ability to accurately and precisely measure genuine PTG. The Posttraumatic Growth Inventory (PTGI), a retrospective self-report survey, is the most commonly used measure of PTG (Tedeschi & Calhoun, 1996). Although hundreds of PTG studies have utilized the PTGI in the past few decades, recent literature has questioned the measurement reliability and validity of the PTGI (Frazier et al., 2009; Jayawickreme & Blackie, 2014; Boals & Schuler, 2017). Originally, Tedeschi and Calhoun reported the PTGI exhibited excellent internal reliability, good test-retest reliability, and strong validity (1996). However, Frazier and colleagues (2009) raised concerns

about the measure when they evaluated the construct validity of the PTGI compared to measures of PTG-related domains (positive relationships, meaning in life, life satisfaction, gratitude, and religious commitment) using a prospective design. Participants were administered the PTGI prior to and several months following a traumatic event to capture perceived growth (Frazier et al., 2009). Similarly, the study measured actual growth by changes in the five PTG-related domains over the same period of time (Frazier et al., 2009). Results from Frazier et al. indicated that higher levels of perceived growth on the PTGI were associated with *higher* levels of distress, whereas actual growth levels from the measures of PTG-related domains were correlated with *lower* levels of distress (Frazier et al., 2009). These results indicate that although the PTGI indicates a positive relationship with distress using a post-trauma self-report design, a prospective design (i.e. evaluating participants prior to and following a traumatic experience) indicated a negative relationship with distress across PTG-related domains (Frazier et al., 2009). Although a prospective design is undoubtedly more accurate at measuring genuine PTG, this approach is impractical for the majority of trauma research. This study, however, does indicate there may be a measurement problem with the PTGI and its relationship to PTG-related domains.

Further, a meta-analysis exploring the relationship between current PTG measures and health outcomes found that PTG was weakly negatively related to depression (r = -.09) and had no significant relationships with anxiety, global distress, or quality of life (Helgeson, Reynolds, & Tomich, 2006). Additionally, PTG was positively associated with intrusive and avoidance thoughts (Helgeson, Reynolds, & Tomich, 2006). Though it is possible for those with PTG to experience both positive and negative effects following a traumatic event (Maercker & Zoellner, 2004), literature suggests that actual growth should be associated with less distress, while

illusory growth should be associated with higher levels of distress and coping (Frazier et al., 2009).

Not only is there a discrepancy in the literature between PTG relationships and reported health outcomes, there is also inconsistency between PTG and its relationship with PTSD symptoms. Though the majority of studies find a positive relationship between PTG and PTSD, there are notable exceptions (Wang, Liu, Li, & Gong, 2016). A recent literature review exploring the relationship between PTG and PTSD in sexual assault victims found that these variables are consistently related across research designs and PTG measures (Ulloa, Guzman, Salazar, & Cala, 2016), yet several studies indicated either no relationship or a negative relationship between PTG and PTSD following sexual assault (Grubaugh & Resick, 2007; Cole & Lynn, 2010). Further, a systematic review exploring PTSD and PTG in breast cancer patients found that although a majority of patients indicated experiencing PTG following a cancer diagnosis, PTSD and PTG were unrelated (Koutrouli, Anagnostopoulos, & Potamianos, 2012). Another systematic review of all types of cancer patients showed a small positive correlation between PTSD and PTG (r = .13), indicating PTSD and PTG are either independent constructs, or current measurement of PTG is flawed (Shand, Cowlishaw, Brooker, Burney, & Ricciardelli, 2015). This inconsistency between the prevalence rates of PTG and the nature of the relationship between PTG and PTSD in PTG literature reviews across similar populations indicates there is a problem with the validity and reliability of the PTGI.

Illusory Growth

The aforementioned inconsistent findings may be because the PTGI is prone to reports of illusory growth. Although there have been attempts at improving the measurement of PTG, the

field is still in dispute as to whether the PTGI and other similar measures of PTG measure actual growth from the traumatic event (Boals & Schuler, 2017; McFarland & Alvaro, 2000; Park, Cohen, & Murch, 1996). The Janus face model of PTG, proposed by Maercker and Zoellner (2004), suggests two sides to PTG, a constructive side and an illusory side (Jayawickreme & Blackie, 2014). The constructive side is what we currently consider PTG scales to be measuring, growth following a traumatic event (Maercker & Zoellner, 2004). The illusory side, consisting of coping mechanisms for the distress associated with trauma (Maercker & Zoellner, 2004), however, may actually be influencing overall PTG scores and the inconsistent relationships with PTG-related domains. Maintaining positive psychological illusions of one's self are associated with positive mental health outcomes (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Following times of immense stress, these optimistic self-views help individuals cope with traumatic events (Helgeson & Taylor, 1993; Leedham, Meyerowitz, Muirhead, & Frist, 1995). Thus, it is reasonable to assume that some of the variance observed in PTG prevalence rates may be due to this residual optimism resulting in an illusion of growth even though no true growth actually occurred. Previously, large prevalence rates for self-reported growth have also been theorized to be due to natural cognitive changes over time (Eve & Kangas, 2015; McFarland & Alvaro, 2000). Researchers have recently theorized, however, that much of the growth exhibited may be illusory due to poor methodology and inadequate measures of PTG (Boals & Schuler, 2017; Jayawickreme & Blackie, 2014).

McFarland and Alvaro conducted a study examining how people use perceived (illusory) growth to cope with traumatic events (2000). This study randomly assigned adult participants to either remember a mild or severe traumatic event from their childhood. Following this experimental manipulation, participants rated themselves using a scale of attributes created from

the PTGI (Tedeschi & Calhoun, 1996) and the Stress-Related Growth Scale (SRGS; Park, Cohen, & Murch, 1996), both immediately after the traumatic event, and at their current standing in adulthood (McFarland & Alvaro, 2000). These attributes included items such as "kind," "tolerant," "courageous," and "self-confident," and the rating scale ranged from 1 (*extremely positive event in my life*) to 9 (*extremely negative event in my life*).

Results from this study indicated that participants reported higher current levels on the attributes than from how they felt immediately following the traumatic event regardless of how severe the trauma was, though the ratings were more severe if the participants recalled a severe event (McFarland & Alvaro, 2000). McFarland and Alvaro (2000) concluded, "Individuals are motivated to exaggerate self-improvement following traumatic life events, presumably as a means of alleviating distress" (p. 334). The tendency to exaggerate positive self-attributes as a way of coping with distress may encourage respondents to report PTG when no actual growth has taken place. This contamination of reports of illusory growth likely plays a role in the previously described erratic prevalence rates, health outcome relationships, and PTG/PTSD relationship inconsistencies found throughout PTG literature, and further emphasizes the need to improve our measurement of PTG.

Minimizing Illusory Growth

One possibility is the manner in which the PTGI, the SRGS, and other similar measures of PTG are worded may encourage reports of illusory growth. By wording items in a leading way such as "I learned a great deal about how wonderful people are" and "I discovered that I'm stronger than I thought I was" in the PTGI, the measure encourages respondents to report elevated amounts of growth (Lechner & Antoni, 2004). Tedeschi and Calhoun previously refuted

this reasoning, stating they found no relationship between the PTG and social desirability in their original evaluation of the PTGI (Calhoun & Tedeschi, 2004). However, we would argue that fooling oneself as a coping mechanism is very different from the construct of social desirability. Given that McFarland and Alvaro (2000) found that people naturally exaggerate the amount of growth experienced following a traumatic event, and that we tend to report both perceived and actual growth when prompted (Frazier et al., 2009), it is reasonable to make measurement changes which will minimize a participant's ability to report illusory growth. More neutral wording of items should encourage respondents to report actual growth instead of illusory growth. This is the first of two major changes Boals and Schuler (2017) made when creating the SRGS-R.

In regards to scaling, most existing measures of PTG, including the two most widely used measures, the PTGI and SRGS, only give respondents the choice to respond positively when reporting growth (i.e. Scaling options of 0 to 5). These choices do not allow for posttraumatic depreciation (PTD), or negative life changes, which often occur following a traumatic event (Baker, Kelly, Calhoun, Cann, & Tedeschi, 2008). Previously, researchers have negatively reworded the PTGI (i.e. changing "I established a new path for my life" to "I have a less clear path for my life") in order to measure PTD (Baker et al., 2008). This modification still biases the items, albeit in the opposite direction. Using a neutral version of the items in conjunction with both positive and negative scaling, however, allows us to measure both PTG and PTD concurrently in the same scale (Boals & Schuler, 2017). This modification may also make these measurements less susceptible to illusory growth and improve relationships with PTG-related domains (Boals & Schuler, 2017). The changing of the response scale to one that ranges from a

negative change to a positive change is the second major change Boals and Schuler (2017) made when creating the SRGS-R.

Revised Stress Related Growth Scale

Ideally, we would make modifications directly to the PTGI since it is the most commonly used measure of PTG. However, its authors will not allow such modifications to their published measure, and attempted to refute Jayawickreme and Blackie's (2014) opinion that illusory growth is present in PTG studies due poor methodology and inadequate measures of PTG (Tedeschi, Addington, Cann, & Calhoun, 2014). Tedeschi et al. (2014) advised against dismissing current PTG findings solely based on the use of a retrospective self-report methodology. They also advised caution when making inferences using any self-report measures, and claimed the evidence supporting the validity and reliability of the PTGI far outweighs the evidence against the measure (Tedeschi, Addington, Cann, & Calhoun, 2014). In a further response to Tedeschi et al.'s comment, Jayawickreme and Blackie maintain the belief that current measures of PTG are simultaneously measuring perceived growth as well as actual growth, citing the findings made in Frazier et al., 2009 (Blackie & Jayawickreme, 2014). Fortunately, the authors of the SRGS (Park, Cohen, & Murch) have given permission to modify their measure. Hence, Boals and Schuler (2017) modified the SRGS instead of the PTGI.

The SRGS-R is different from both the SRGS and the PTGI in two ways: it utilizes more neutral wording of items and it allows for positive and negative responses in the scaling. Boals and Schuler (2017) originally proposed this modification, and found the SRGS-R was negatively related to depression, anxiety, global distress, PTSD symptoms, and avoidance-focused coping, and positively related to positive well-being, quality of life, problem-focused coping, and

emotion-focused coping. In comparison, the PTGI was unrelated to depression, anxiety, global distress, and quality of life, and positively related to PTSD symptoms, positive well-being, problem-focused coping, emotion-focused coping, and avoidance-focused coping (Boals & Schuler, 2017). The unmodified SRGS exhibited similar relationships to the PTGI except that there was no relationship between PTG and PTSD symptoms or avoidance-focused coping (Boals & Schuler, 2017). In comparison of these outcomes, it is clear that by allowing respondents to report both PTG and PTD while limiting illusory growth through unbiased wording of items, the SRGS-R improves on both the SRGS and the PTGI.

Boals and Schuler theorize utilizing both positive scaling and positively worded items on the PTGI and the SRGS encourages respondents to over-report growth following a traumatic event, while the SRGS-R limits this over-reporting (2017). However, since the two modifications were made concurrently, we do not know which modification was responsible for the improvements in PTG measurement, or if it was a combination of the two.

Present Study

The aim of the current study was to expand upon Boals and Schuler's (2017) evaluation of the SRGS-R. In this study, we explored whether utilizing more neutral wording of items, allowing for positive and negative responses in the scaling, or a combination of both modifications is responsible for the improvements in PTG measurement. This study theorizes that each modification to the SRGS is partly responsible for the improvements in PTG measurement. It is the combination of the two modifications, however, that produces the greatest differences in PTG measurement.

In regards to coping, Boals and Schuler (2017) used the Brief COPE Inventory to assess coping responses to stress. The PTGI was strongly associated with the overall measure while there was no association with the SRGS-R (Boals & Schuler, 2017). Further, the PTGI had a positive relationship with all three coping subscales (problem-focused, emotion-focused, and avoidance-focused), while the SRGS-R had a weak positive relationship with emotion-focused coping and a significantly negative relationship with avoidance-focused coping (Boals & Schuler, 2017). By including the full 60-item COPE Inventory (Carver, Scheier, & Weintraub, 1989) in this study, we attempted to obtain a more nuanced assessment of coping styles.

The hypotheses for this study are as follows:

1. The full SRGS-R would elicit the lowest levels of PTG. The two modified versions would elicit less PTG than the PTGI, but more PTG than the full SRGS-R.

2. The SRGS-R would show the strongest relationships with the mental health measures (lower levels of depression, anxiety, global distress, PTSD symptoms, and greater quality of life), while the modified versions would show improvements over the PTGI, but these improvements would not be as strong as seen with the SRGS-R.

3. All three versions of the SRGS-R would be positively associated with problem-focused coping and have no relationship with emotion-focused and avoidance-focused coping, while the PTGI would be positively related to all three forms of coping.

Method

Participants

Participants were recruited from Amazon Mechanical Turk (MTurk), a website where respondents complete surveys in exchange for monetary compensation. The final sample

consisted of 764 participants (60.1% female) residing in the United States. Ages ranged from 18-77 (*M* = 37.58, *SD* = 12.38), and the sample was predominantly Caucasian (73.4%), which is similar to previous MTurk studies (75% in Boals & Schuler, 2017). Participants were compensated $.75 for completing the study. The University of North Texas Institutional Review Board approved this study. See Tables 1 and 2 for complete demographic information.

Measures

Posttraumatic Growth Inventory

The Posttraumatic Growth Inventory (PTGI) is the most commonly used measure of PTG (Tedeschi & Calhoun, 1996). The PTGI is a 21-item questionnaire designed to assess the level of PTG an individual has experienced following a specific traumatic event. The scale ranges from 0 (*I did not experience this change as a result of my crisis*) to 5 (*I experienced this change to a very great degree as a result of my crisis*) and is composed of five subscales - relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. Items in the PTGI are all worded positively. High internal reliability has been reported in an MTurk sample (α = .90; Boals & Schuler, 2017). In the current study, the PTGI had an excellent internal reliability (α = .95).

Stress Related Growth Scale-Revised

The SRGS-R is a modified version of the original Stress Related Growth Scale (Park, Cohen, & Murch, 1996). Three versions of the SRGS-R were utilized in this study. The first version only altered the scoring of the original SRGS to allow for positive and negative scoring of items ("+3 = A very positive change" to "-3 = A very negative change" and "0 = No change";

SRGS-R-S). The second version used the original positive scoring and altered the wording of each item to be more neutral (i.e. “I experienced a change in how I treat others” instead of “I learned to be nicer to others”; SRGS-R-N). The final version of the SRGS-R consisted of both the positive and negative scoring and the neutral wording modifications from the original SRGS. The fully modified SRGS-R demonstrated excellent internal reliability in an MTurk sample (α = .93; Boals & Schuler, 2017). In the current study, the SRGS-R (α = .92), the SRGS-R-S (α = .93), and the SRGS-R-N (α = .96) all exhibited excellent internal reliability.

Coping

The COPE Inventory (COPE; Carver, Scheier, & Weintraub, 1989) assesses coping responses to stress. The COPE consists 60 items separated into 14 subscales, which are commonly combine to three general subscales (problem-focused coping, emotion-focused coping, and avoidance-focused coping; Carver, 1997). The COPE inventory demonstrated good internal reliability in a college student sample (α = .74; Carver, Scheier, & Weintraub, 1989), and a brief version of the COPE inventory demonstrated excellent internal reliability in an MTurk sample (α = .90; Boals & Schuler, 2017). The general subscales in the MTurk sample also showed strong internal reliability (problem-focused coping α = .83; emotion-focused coping α = .80; avoidance-focused coping α = .83; Boals & Schuler, 2017). In the current study, the overall COPE (α = .95), the problem-focused coping subscale (α = .89), and the avoidance-focused (α = .83) coping subscale all exhibited excellent internal reliability. The emotion-focused coping subscale (α = .65) exhibited questionable internal consistency.

Depression, Anxiety, and Stress

The Short-form Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995) was used to measure depression, stress, and anxiety levels. The depression, anxiety, and stress subscales consist of 7 items each, and items are scored 0 to 3 with higher scores indicating higher levels of symptoms. Respondents are asked to rate how severely they have experienced symptoms in the past week. The depression (α = .86; Boals & Schuler, 2017), anxiety (α = .89; Boals & Schuler, 2017), and stress (α = .90, Pollert, Kauffman, & Veilleux, 2016) subscales of the DASS demonstrated excellent internal reliability in MTurk samples. In the current study, the depression (α = .91), anxiety (α = .91), and stress (α = .90) subscales of the DASS all exhibited excellent internal reliability as well.

Positive and Negative Affect

Positive well-being and global distress was measured using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS consists of two subscales with 10 items each and scored 1-5 with higher scores representing higher positive or negative affect. Respondents were asked to what extent they felt about positively (i.e. “excited” and “proud”) and negatively (i.e. “distressed” and “hostile”) worded items. Participants in this study answered each item with *very slightly or not at all, a little, moderately, quite a bit,* or *extremely*. Total score is the sum of the items (10-50). The PANAS positive (α = .90) and negative (α = .93) subscales both had high internal reliability in an MTurk sample (Boals & Schuler, 2017). In the current study, the positive (α = .92) and negative (α = .94) subscales of the PANAS both exhibited excellent internal reliability.

PTSD Symptom Severity

The PCL-5 (Weathers et al., 2013) provided a measure for PTSD symptoms. It is a 20-item questionnaire designed to screen individuals, diagnose symptoms, and monitor symptom change throughout the PTSD treatment process by asking participants about symptoms relating to a "very stressful experience." The response to each item is on a 5-point scale. Participants answered each item with *not at all, a little bit, moderately, quite a bit,* or *extremely*. Total score is the sum of the items (0-80). The PCL-5 had high internal reliability (α = .94) and was highly correlated with a clinically administered measure of PTSD symptom severity (CAPS; *r* = .81) in a sample of combat veterans (Keane et al., 2014, p. 1140). High internal reliability has also been reported in samples of MTurk participants (α = .96; Boals & Schuler, 2017) and college students (α = .94; Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, 2015). In the current study, the PCL-5 exhibited an excellent internal reliability (α = .96).

Quality of Life

The General Health Questionnaire (GHQ; Goldberg & Blackwell, 1970) is a 12-item survey asking about general mental health in the past few weeks (i.e. "Have you recently felt constantly under strain"). The GHQ is scaled 1-4. Higher scores on the GHQ indicate worse health symptoms, so this measure was reverse scored to indicate higher quality of life (Boals & Schuler, 2017). The GHQ demonstrated excellent internal reliability in an MTurk sample (α = .92; Boals & Schuler, 2017). In the current study, the GHQ exhibited an excellent internal reliability (α = .92).

Trauma History

The Life Events Checklist (LEC-5; Weathers et al., 2013) is a commonly used trauma history questionnaire often used in conjunction with the PCL-5. The LEC-5 consists of 16 specific categories of potentially traumatic events and one item giving the option to list any other traumatic event to determine the degree of lifetime exposure to traumas. We also asked participants to identify their most stressful event and disclose how long ago the trauma occurred.

Demographics

The survey asked participants to report their gender, ethnicity, age, and whether or not they live in the U.S.

Procedures

Prior to participation, participants read an online informed consent form approved by the UNT Institutional Review Board and agreed to participate in the study. Participants then identified their most traumatic or life-altering event from the LEC-5 (See Table 2), as well as disclosed how long ago the trauma occurred. Participants were then randomly assigned to complete either the PTGI or one of the three SRGS-R measures. Finally, all participants completed the COPE inventory, the mental health measures, and a demographics questionnaire. The mental health measures used in this study were the same measures used in Boals and Schuler (2017) and a meta-analysis on PTG (Helgeson et al., 2006) for the purposes of allowing us to make direct comparisons between the results obtained in the current study and past studies.

Results

Data Cleaning

Data collection occurred on Amazon's Mechanical Turk from November 8 to 9, 2017. The initial dataset consisted of 996 respondents, however, 214 people did not complete the survey (either decided not to participate after reading the informed consent, did not answer the initial validation question ending the survey, or dropped out before the final page). Data from these incomplete surveys were excluded from analyses. Start times were then evaluated and cases who completed the survey in less than five minutes (n = 8) were excluded from the analyses. This cutoff was initially set at 15 minutes in the proposal; however, average completion time for the survey was 20 minutes, so we reduced the cutoff to five minutes.

We then imputed missing data using median imputation with SAS Enterprise Miner, and removed any case missing greater than 10% from any one measure (n = 6). The data were then assessed for normality (See Table 3). All variables were within acceptable skewness and kurtosis scores based on the guidelines set by Curran, West, and Finch (1996), and cases which had values greater than three standard deviations from the mean were removed (n = 4). The final sample size for this study was 764 participants.

Preliminary Analyses

Though we used random assignment to determine which PTG scale participants received, there was still a slight possibility of differences between groups on several demographic variables. Gender, ethnicity, age, and types of traumas between the four PTG measurement conditions were assessed for possible differences using one-way ANOVA tests, and no statistically significant differences were observed (see Table 1). We also conducted an

exploratory analysis investigating whether the time since the traumatic event occurred influenced reported PTG scores on each of the PTG measures using one-way ANOVAs. Time since the traumatic event did not significantly influence PTG scores on any of the four PTG measures for a one-time traumatic event. For multiple traumatic events, only the SRGS-R had significant differences between time categories ($F(5, 56) = 2.47$, $p = .043$). However, these differences were not statistically significant when the one-time trauma and multiple trauma conditions were combined.

Primary Analysis

For our primary analysis (H_1), we could not make a direct comparison using inferential statistics methods (i.e. multivariate analyses of variance) since the four measures use two different response scales. To determine the amounts of reported growth between PTG measures, we compared the percentage of scores above and below several points on each measure using chi-square analyses. We used three cut points listed below:

1. A small amount of growth: For the measures that use a scale with positive scores only, we determined the percentage of participants whose mean score per item is between 0 and 1.99 (full scale range is 0 to 5). For the measures that use a scale that includes both positive and negative response choices, we determined the percentage of participants whose mean score per item is between 0 and .99 (full scale is 0 to 3). Note that for both scales, these ranges comprise the bottom 33.3% of the total reported growth range.

2. A moderate amount of growth: For the measures that use a scale with positive scores only, we determined the percentage of participants whose mean score per item is between 2 and 3.99 (full scale range is 0 to 5). For the measures that use a scale that includes both positive and

negative response choices, we determined the percentage of participants whose mean score per item is between 1 and 1.99 (full scale is 0 to 3). Note that for both scales, these ranges comprise the middle 33.3% of the total reported growth range.

3. A large amount of growth: For the measures that use a scale with positive scores only, we determined the percentage of participants whose mean score per item is 4 or greater (full scale range is 0 to 5). For the measures that use a scale that includes both positive and negative response choices, we determined the percentage of participants whose mean score per item is 2 or greater (full scale is 0 to 3). Note that for both scales, these ranges comprise the top 33.3% of the total reported growth range.

See Table 4 for individual PTG group sample sizes.

The first hypothesis was supported. The SRGS-R elicited the most PTG in the small amount of growth group (66.1%), and the least amount of growth in the moderate group (22.2%). The PTGI elicited the least amount of PTG in the small amount of growth group (28.7%), and the most PTG in the moderate group (28.7%). Using chi square analyses, there were statistically significant differences between PTG measures in both growth categories (Small growth $\chi^2(1, N = 382) = 53.54$, $p < .001$; moderate growth $\chi^2(1, N = 382) = 45.99$, $p < .001$). Though the PTG scores in the large amount of growth group between the SRGS-R (11.7%) and the PTGI (13.9%) differed, the percentages were not statistically significant ($\chi^2(1, N = 382) = .41$, $p = .522$).

The SRGS-R-S fell between the SRGS-R and the PTGI with 55.6% of scores in the small amount of growth group and 24.9% of scores in the moderate amount of growth group. However, the SRGS-R-S elicited the most PTG in the large amount of growth group (19.5%), and was the only measure significantly different from the SRGS-R in this category ($\chi^2(1, N = 349) = 4.11$, $p = .042$). The SRGS-R-N exhibited a pattern similar to the PTGI with slightly more PTG in the

small (31.6%) and large growth groups (15.5%), and slightly less PTG in the moderate growth group (52.9%). See Table 5 for all chi square analyses.

Concerning PTD, 17.2% of participants in the SRGS-R condition and 13.0% in the SRGS-R-S condition reported negative growth scores. Though these participants' average growth scores were negative, they still reported at least a small amount of growth on some of the items, thus, their scores were included in the small amount of growth groups.

Hypothesis 2: Mental Health Measures

We then tested the second hypothesis that the SRGS-R would display improved relationships with the mental health measures over the PTGI, and that the SRGS-R-S and SRGS-R-N relationships would exhibit similar improvements, but would not be as strong as the SRGS-R. The SRGS-R-N exhibited strong positive relationships with PTSD symptoms, depression, anxiety, stress, and global distress, the weakest positive relationship with positive well-being, and a significant negative relationship with quality of life. All of these relationships are the polar opposite of our second hypothesis. An evaluation of this measure indicated that the measure does not prompt participants to report growth at all. Instead, it asks them to report how much they have changed following the negative event. Therefore, the relationships between the SRGS-R-N and our outcome variables will be addressed in the discussion, but the measure will not be utilized in the trend analyses for the second and third hypotheses. See Table 6 for all correlations and *Z* test analyses.

Using overall trends in the data, the second hypothesis was supported. The SRGS-R was significantly related to lower levels of PTSD symptoms, depression, and stress, and significantly positively related to positive well-being and quality of life. There were also negative

relationships with anxiety and global distress, but these correlations were not statistically significant. In contrast, the PTGI was significantly positively related to PTSD symptoms and unrelated to depression, anxiety, and stress. All of these differences between the two growth measures were statistically significant. The PTGI exhibited similar relationships as the SRGS-R with positive well-being, global distress, and quality of life. The SRGS-R-S displayed correlations between the SRGS-R and the PTGI on all mental health measures except global distress and quality of life, but these differences were not statistically significant.

Hypothesis 3: Coping

Finally, we tested the third hypothesis that the SRGS-R and SRGS-R-S would be positively associated with problem-focused coping and have no relationship with emotion-focused and avoidance-focused coping, while the PTGI would be positively related to all three forms of coping. This hypothesis was partially supported. All three growth measures displayed significant positive correlations with overall coping, though the SRGS-R had the weakest correlation, the PTGI had the strongest, and the SRGS-R-S fell between the other two measures.

The SRGS-R had a significant positive correlation with problem-focused coping and emotion-focused coping, and a negative correlation with avoidance-focused coping, though this relationship was not statistically significant. The PTGI had a significant positive relationship with all three coping styles, with problem-focused and avoidance-focused coping being significantly higher than the SRGS-R. The SRGS-R-S exhibited a significantly higher problem-focused coping correlation than the SRGS-R, and a significantly lower avoidance-focused coping correlation than the PTGI.

Discussion

The current study expanded upon Boals and Schuler's (2017) evaluation of the SRGS-R. In this study, we explored whether utilizing more neutral wording of items, allowing for positive and negative responses in the scaling, or a combination of both modifications is responsible for the improvements in PTG measurement. The results from this study indicate that the SRGS-R improves on PTGI by allowing respondents to report both PTG and PTD while limiting illusory growth through unbiased wording of items. By examining trends in the data for the primary hypothesis, the percentages show that the SRGS-R elicited the most PTG in the small amount of growth group (66.1%), and the least amount of growth in the moderate group (22.2%). In contrast, the PTGI elicited the least amount of PTG in the small amount of growth group (28.7%), and the most PTG in the moderate group (57.4%), and the two modified versions displayed scores between the SRGS-R and the PTGI. Percentages of growth in the large amount of growth group for all four measures were not statistically different. It should also be noted that though the negative scores for the positive and negative scoring measures were included in the small amount of growth groups, if they were removed for the analyses, the trends would be remain the same. These trends infer that the SRGS-R exhibits the lowest amount of illusory growth due to the neutral wording and positive and negative scaling options, and the PTGI exhibits the largest amount of illusory growth.

The second and third hypotheses explored the relationships between the four PTG measures and several mental health measures and coping styles found in Boals and Schuler (2017) and a PTG meta-analysis (Helgeson et al., 2006). After examining the correlations between variables (See Table 6), we determined the SRGS-R-N had strong positive associations with all outcomes except quality of life. A reassessment of the measure indicated that the SRGS-

R-N is not actually measuring growth. Since participants were not asked to report growth in the instructions, the scaling, or through positively worded items, the measure only prompts participants to report changes since the negative event. Thus, we included the measure in our discussion of the relationships between the PTG measures, but chose not to include the SRGS-R-N in the analysis of trends for the second and third hypotheses.

Though the SRGS-R-N does not report growth following a traumatic event, the relationships exhibited with the mental health measures are still interesting. The findings of this study indicate that when participants are not prompted to report how much they have grown through positively worded items or positive and negative scaling options, but only how much they have changed since the traumatic event, they tend to report stronger relationships with negative outcomes. Therefore, they should also be reporting lower levels of PTG (Frazier et al, 2009; Boals & Schuler, 2017). This contradicts current PTG literature, which indicates the majority of people experience moderate to large amounts of growth following traumas (Linley & Joseph, 2004). When given the option of reporting negative changes with positive and negative scaling options, people still report more PTG (36.8-80.8%) than PTD (4.5-22%; Nordstrand, Hjemdal, Holen, Reichelt, & Bøe, 2017). Similarly, when the PTG measure contains both positive and negatively worded items concurrently, people report higher amounts of PTG (M = 52.36, SD = 24.44) than PTD (M = 16.38, SD = 17.16; Cann, Calhoun, Tedeschi, & Solomon, 2010). Even when given both neutral wording of items and the positive and negative scaling options in this study (SRGS-R), we still see more PTG (75.6%) reported than PTD (17.2%) or no growth (6.7%). The results from the SRGS-R-N, however, suggest that trauma has more of a negative impact than a positive impact, thus the growth reported in most PTG measures is primarily illusory growth.

By not asking participants to report growth in this measure, the results indicate the SRGS-R-N had the strongest positive relationships with PTSD symptoms, depression, anxiety, stress, global distress, and avoidance coping, and it was the only measure to have a negative relationship with quality of life. This indicates that it is only when prompted to report growth that participants report negative or no relationships with negative outcomes. This finding contributes to a growing body of evidence that current measures of PTG are over-reporting growth, and measures that report lower amounts of growth are reporting less illusory growth than those reporting higher growth scores.

The results of this study for the remaining PTG measures (SRGS-R, PTGI, and SRGS-R-S) support the findings of Boals and Schuler (2017). Similar to Boals and Schuler (2017), this study found the SRGS-R was negatively related to depression, anxiety (negative, but not statistically significant), global distress (negative, but not statistically significant), PTSD symptoms, and avoidance-focused coping (negative, but not statistically significant), and positively related to positive well-being, quality of life, problem-focused coping, and emotion-focused coping. In comparison, the PTGI was unrelated to depression, anxiety, and global distress, and positively related to PTSD symptoms, positive well-being, problem-focused coping, emotion-focused coping, and avoidance-focused coping. The only difference between this study and the previous study is that the PTGI had a positive relationship with quality of life, and Boals and Schuler (2017) found no relationship. These results for the PTGI are similar to several PTG meta-analyses as well (Helgeson et al., 2006; Wang et al., 2016). Helgeson and colleagues (2006) found the PTGI was weakly negatively related to depression (r = -.09) and had no significant relationships with anxiety, global distress, or quality of life, whereas our study only differed by a weak positive relationship with depression (r = .06) and a positive correlation with

quality of life. Our findings also replicate Wang and colleagues (2016) in their meta-analysis of PTG and PTSD, with both studies reporting strong positive relationships between the two constructs. We also included the stress subscale of the DASS in this study, which displayed a negative relationship with the SRGS-R and no relationship with the PTGI. These findings provide further evidence that the SRGS-R is an improvement over the PTGI in regards to measuring actual growth, while limiting illusory growth.

Limitations

The current study contains several limitations worthy of note. First, we could not make a direct comparison using inferential statistics methods (i.e. multivariate analyses of variance) since the four measures use two different response scales. Thus, we examined the percentages of cases in small, moderate, and large PTG groups using chi square analyses, and we chose to reject the null hypotheses based on trends in the data. Concerning the SRGS-R-N, we did not weight our decisions heavily on this measure since it was not measuring growth following the negative event.

Second, we used a self-report, retrospective design for measuring growth. Though a prospective design, similar to the design found in Frasier et al. (2009), would have provided a stronger research design, this is impractical for the majority of PTG studies since researchers do not typically have access to participants prior to and following traumatic events. Further, the majority of PTG studies throughout the literature do not use prospective designs, thus our study design is more generalizable. Finally, the internal reliability of the emotion-focused coping subscale was questionable ($\alpha = .65$). Though the coping style was included in our analyses, we did not weight our decisions heavily on this measure.

Future Directions

Future studies should examine the SRGS-R in other samples (i.e. in-person, severely traumatized, military veterans). Exploring PTG in these samples will provide more evidence as to whether the SRGS-R is an improvement over the PTGI and other PTG measures. Another option for future studies would be to use a non-traumatic event instead participants' most stressful event as the primer for responding to the questionnaires to explore illusory growth further. Finally, the SRGS-R would benefit from further reliability (i.e. test-retest reliability) and validity (i.e. predictive, concurrent, and discriminant validities) measurements, as well as a factor analysis.

Conclusion

The SRGS-R is not a perfect measure. Yet, it does improve on the PTGI by allowing respondents to report both PTG and PTD while limiting illusory growth through unbiased wording of items. This study found the combination of these changes to existing PTG measures yields the greatest improvements in measurement. By improving the measurement of PTG, we can reduce the variation in reported PTG following traumatic events found throughout the literature. This will allow researchers and clinicians to better identify which factors contribute to growth following traumatic events, and aid them in designing treatments to encourage actual growth following traumas.

Table 1

*Demographic Information and Covariate Analyses on the Sample (*N = *764)*

	Frequency	%	*F*	*p*
Gender			1.23	.296
Female	459	60.1		
Male	296	38.7		
Other	5	.7		
Prefer Not to Say	4	.5		
Ethnicity			1.81	.145
Caucasian	561	73.4		
African American	68	8.9		
Asian/Pacific Islander	41	5.4		
Hispanic	58	7.6		
Native American	13	1.7		
Multiracial	15	2.0		
Prefer Not to Say	8	1.0		
Trauma Type	-	-	.65	.586
	Range	*M (SD)*		
Age	18-77	37.58 (12.38)	1.20	.310

Note: For Trauma Type frequencies, see Table 2; *M* = Mean; *SD* = Standard Deviation.

Table 2

Frequencies of Trauma Types Based on the LEC-5 (N = 764)

Trauma Type	Most Traumatic Event	
	Frequency	%
Other	178	23.3
Life-threatening illness or injury	101	13.2
Transportation Accident	87	11.4
Natural Disaster	81	10.6

(table continues)

Trauma Type	Most Traumatic Event	
	Frequency	%
Sexual Assault	59	7.7
Physical Assault	47	6.2
Sudden Violent Death	37	4.8
Sudden Accidental Death	33	4.3
Serious Accident	30	3.9
Fire or Explosion	27	3.5
Uncomfortable Sexual Experience	25	3.3
Severe Human Suffering	15	2.0
Assaulted w/ Weapon	15	2.0
Combat Exposure	11	1.4
Causing Serious Harm or Death	9	1.2
Toxic Substance Exposure	6	.8
Captivity	3	.4

Table 3

Descriptive Statistics for All Variables (N = 764)

Variables	α	Mean	*SD*	Range	Skewness	Kurtosis
Posttraumatic Growth						
SRGS-R	.92	9.86	15.74	-34 – 45	.044	.360
PTGI	.95	55.11	25.42	0 – 105	-.440	-.590
SRGS-R-N	.96	38.40	20.17	0 – 75	-.301	-.711
SRGS-R-S	.93	13.79	15.90	-33 – 45	.087	-.128
Mental Health Measures						
PTSD Symptoms (PCL-5)	.96	25.43	20.02	0 – 76	.490	-.798
Depression (DASS)	.91	6.07	5.58	0 – 21	.636	-.654
Anxiety (DASS)	.91	5.87	5.62	0 – 21	.682	-.623
Stress (DASS)	.90	5.91	5.53	0 – 21	.675	-.616
Positive Well-being (PANAS-P)	.92	29.37	9.39	10 – 50	.068	-.660

(table continues)

Variables	α	Mean	*SD*	Range	Skewness	Kurtosis
Global Distress (PANAS-N)	.94	19.52	9.69	10 – 48	.994	-.041
Quality of Life (GHQ)	.92	34.16	7.31	12 – 48	-.776	.350
Coping						
Overall Coping (COPE)	.95	128.20	30.15	60 – 218	.176	-.153
Problem-focused Coping	.89	43.72	13.16	20 – 80	.071	-.689
Emotion-focused Coping	.65	47.31	11.61	20 – 80	-.021	-.475
Avoidance-focused Coping	.83	37.18	11.78	20 – 73	.607	-.396

Note: α = Cronbach's alpha; *SD* = Standard Deviation; SRGS-R = Revised Stress Related Growth Scale; PTGI = Posttraumatic Growth Inventory; SRGS-R-N = Revised Stress Related Growth Scale with neutral wording; SRGS-R-S = Revised Stress Related Growth Scale with positive and negative scaling; DASS = Depression, Anxiety, Stress Scales; PANAS-P = Positive and Negative Affect Schedule Positive subscale; PANAS-N = Positive and Negative Affect Schedule Negative subscale; GHQ = General Health Questionnaire.

Table 4

Frequencies of Posttraumatic Growth Measures

		Posttraumatic Growth					
		Small		Moderate		Large	
	n	Frequency	%	Frequency	%	Frequency	%
SRGS-R	180	119	66.1	40	22.2	21	11.7
PTGI	202	58	28.7	116	57.4	28	13.9
SRGS-R-N	206	65	31.6	109	52.9	32	15.5
SRGS-R-S	169	94	55.6	42	24.9	33	19.5

Note: SRGS-R = Revised Stress Related Growth Scale; PTGI = Posttraumatic Growth Inventory; SRGS-R-N = Revised Stress Related Growth Scale with neutral wording; SRGS-R-S = Revised Stress Related Growth Scale with positive and negative scaling.

Table 5

Chi Square Analyses (H_1)

	Posttraumatic Growth					
	Small		Moderate		Large	
	χ^2	Sig.	χ^2	Sig.	χ^2	Sig.
SRGS-R x PTGI	53.54	< .001	48.82	<.001	.41	.522
SRGS-R x SRGS-R-N	45.99	< .001	38.18	< .001	1.21	.271
SRGS-R x SRGS-R-S	4.03	.045	.34	.563	4.11	.042
PTGI x SRGS-R-N	.39	.532	1.93	.165	.23	.633
PTGI x SRGS-R-S	27.55	< .001	39.93	< .001	2.15	.143
SRGS-R-N x SRGS-R-S	22.02	< .001	30.39	< .001	1.03	.309

Note: SRGS-R = Revised Stress Related Growth Scale; PTGI = Posttraumatic Growth Inventory; SRGS-R-N = Revised Stress Related Growth Scale with neutral wording; SRGS-R-S = Revised Stress Related Growth Scale with positive and negative scaling.

Table 6

Correlations and Significance Tests Between the Four Measures of PTG and Various Measures

Measure	(1) SRGS-R	(2) PTGI	(3) SRGS-R-N	(4) SRGS-R-S	*Z* score Significance Tests (H_2 & H_3) (1)x(2)	(1)x(3)	(1)x(4)	(2)x(3)	(2)x(4)	(3)x(4)
PTSD Symptoms (PCL-5)	-.242**	.193**	.451***	-.006	4.28***	7.13***	2.23*	2.91**	1.92	4.70***
Depression (DASS)	-.185*	.060	.346***	-.067	2.39*	5.33***	1.11	3.02**	1.21	4.09***
Anxiety (DASS)	-.137	.083	.342***	-.040	2.14*	4.81***	.91	2.74**	1.17	3.79***
Stress (DASS)	-.190*	.029	.306***	-.035	2.14*	4.94***	1.46	2.88**	.61	3.36***
Pos. Well-being (PANAS-P)	.379***	.347***	.229**	.369***	.36	1.61	.11	1.29	.24	1.47
Global Distress (PANAS-N)	-.120	.050	.311***	-.142	1.65	4.30***	.21	2.72**	1.84	4.44***
Quality of Life (GHQ)	.201**	.220**	-.196**	.175*	.19	3.91***	.25	4.23***	.45	3.59***
Overall Coping (COPE)	.252**	.541***	.504***	.470***	3.37***	2.89**	2.34*	.51	.91	.43
Problem-focused Coping	.243**	.476***	.418***	.541***	2.61**	1.92	3.31***	.73	.83	1.53
Emotion-focused Coping	.500***	.613***	.432***	.603***	1.59	.85	1.37	2.52*	.15	2.25*
Avoidance-focused Coping	-.142	.312***	.402***	-.077	4.51***	5.53***	.61	1.04	3.80***	4.81***

Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$; (1) SRGS-R = Revised Stress Related Growth Scale; (2) PTGI = Posttraumatic Growth Inventory; (3) SRGS-R-N = Revised Stress Related Growth Scale with neutral wording; (4) SRGS-R-S = Revised Stress Related Growth Scale with positive and negative scaling

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